

Pichamon Intamo 2011: Role of Rhizobacteria of Citronella Grass (*Cymbopogon winterianus* Jowitt) on Yield and Bioactive Ingredient of Plant. Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Assistant Professor Savaporn Supaphol, Ph.D. 139 pages.

Health food was a growing niche in the food industry. Currently, the demand for organic vegetable and herbal product regularly exceeds supply. Therefore, the need to isolate and select superior, naturally occurring rhizosphere bacteria, which enhances plant growth, is of considerable interest. The objectives of this research are to study bacterial community structure and isolation bacteria from rhizosphere of Citronella grass at the age of 2, 4, 6 and 8 months. Rhizosphere bacteria from Citronella grass were tested for their efficiency to enhance growth of order Gramineae plantlet. The study has shown that at the age of 6 months the rhizobacterial community structure of Citronella grass shows positive correlation with available phosphorus and total nitrogen, resulting in increased oil yield. At the age of 8 months, the rhizobacterial community structure shows positive correlation with organic matter content and extractable potassium, thus the rhizosphere bacteria augmented citronellol compound. Seventy-six plant growth promoting rhizobacteria were isolated from Citronella grass the age of 2, 4, 6 and 8 months these were 26, 9, 31 and 10 isolates, respectively. They were tested for their efficacy to nitrogen fixing, phosphate solubilizing and indole acetic acid (IAA) production. As well as the efficiency of strain Rh9 fixed maximum nitrogen ($5.3 \text{ } \mu\text{mol hr}^{-1}$), strain Rh55 solubilized maximum phosphate ($0.56 \text{ } \mu\text{g ml}^{-1}$) and strain Rh54 produced maximum IAA ($5.21 \text{ } \mu\text{g ml}^{-1}$). In addition, strain Rh9, Rh55 and Rh54 were identified by 16S rRNA gene analysis. Three strains were represented as follow, *Bacillus* sp. PS2, *Curtobacterium citreum* strain LCR23 and *Klebsiella* sp. ICB572. Potential for enhancement of plant growth of order Gramineae plantlet under tissue cultured condition, which inoculated with *Bacillus* sp. PS2, *Curtobacterium citreum* strain LCR23, *Klebsiella* sp. ICB572 and co-inoculated. The experiment was a completely randomized design (CRD) with 4 replicates (6 treatments). One tissue-cultured vetiver plantlet (*Vetiveria zizanioides* L. Nash). The results indicate that a remarkable increase in shoot and root length, fresh weight and dry weight were recorded due to single and co-inoculation. The overall growth performance of inoculated plant growth promoting was significantly increased compared to control (un-inoculated and *E. coli* DH5 α).

Student's signature

Thesis Advisor's signature